Continuous Integration und DevOps mit dem Open Build Service

SLAC 7.6.2013

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We adapt. You succeed.

Agenda

- OBS Überblick
- Nutzer/Anwendungsszenarien
- osc - cmdline client
- Source services
- Ungewöhnliche Deliverables(Kiwi)
- OBS Appliance
- Continuous Integration/DevOps

OBS History

- Created in 2005 as a rewrite of SUSE's internal autobuild system
  - Goals: transparency, flexibility, openness
  - First presented at FOSDEM 2006
- 2010: OBS-2.0 with features for the MeeGo project
- 2011: OBS-2.1 with workflow features for openSUSE source handling
- Current Release: OBS-2.4

Example Users

- Distribution development, Maintenance Updates

suse intel NOKIA Connecting People sgi CRAY DELL

- Open Source Communities

openSUSE mer

- Add-Ons: Driver Developer and ISVs

- Researchers/Universities
- Administration Teams

OX OPEN-XCHANGE Microsoft

SUSE

Open Build Service

(previously known as openSUSE Build Service)

- Automated, repeatable and consistent :
  - Clean chroot
  - Handle build dependencies and autorebuild if needed
  - Take care of publishing consistent repositories
- Generate packages or **full OS images / appliances**

Development

- Licensed under GPLv2
  - https://github.com/openSUSE/open-build-service/
- Lines of Code: > 150000
  - Perl/Python/Ruby
- Mostly maintained by SUSE, but many contributions from community members & other companies

Numbers

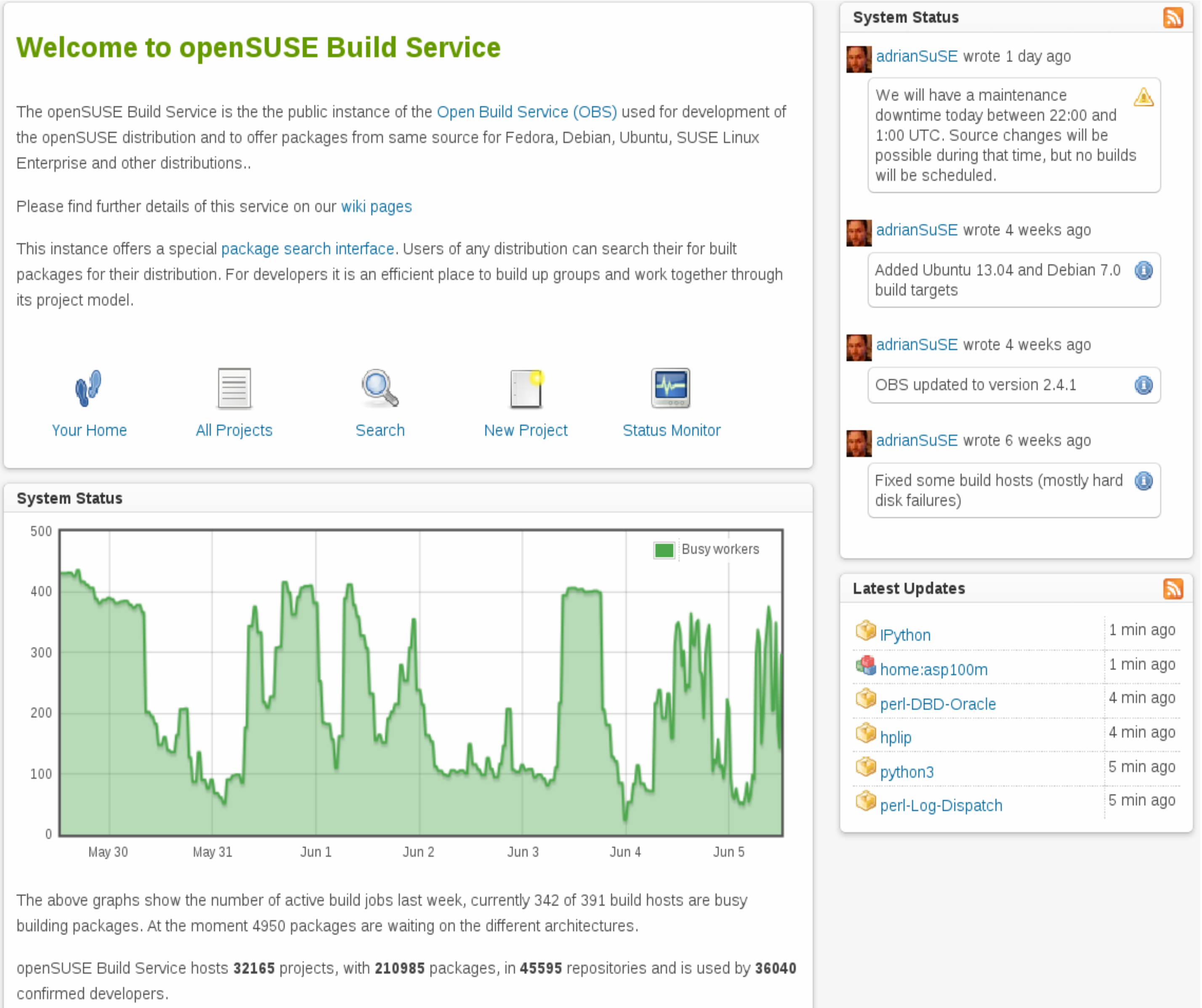
- Confirmed Users: >32000
- Package builds per day: > 51000
  - Build farm: 38 hosts, 310 workers
- Storage:
  - Sources: 3.3 Tbytes
  - Binaries: 6.9 TBytes

Features

- Multiple distributions, multiple architectures
  - rpm, deb, archlinux, image creation
- Sand-boxed builds (kvm/xen/lxc) on a build farm
- Easy branching with automatic merges
- Continuous Integration
  - Automatic rebuilds on changes (both source and build packages), automatic ordering of builds
  - **Consistent, reproducible builds**

User Interface

- REST based API, so multiple interfaces can co-exist
- Web UI
  - Great to get an overview of a project
  - Simple package fixes
- OSC command line client
  - Works like an SCM system (svn, git)
  - Supports local builds for testing



Welcome to openSUSE Build Service

The openSUSE Build Service is the the public instance of the Open Build Service (OBS) used for development of the openSUSE distribution and to offer packages from same source for Fedora, Debian, Ubuntu, SUSE Linux Enterprise and other distributions..

Please find further details of this service on our wiki pages

This instance offers a special package search interface. Users of any distribution can search their for built packages for their distribution. For developers it is an efficient place to build up groups and work together through its project model.

System Status

The above graphs show the number of active build jobs last week, currently 342 of 391 build hosts are busy building packages. At the moment 4950 packages are waiting on the different architectures.

openSUSE Build Service hosts **32165** projects, with **210985** packages, in **45595** repositories and is used by **36040** confirmed developers.

System Status

adrianSuSE wrote 1 day ago

We will have a maintenance downtime today between 22:00 and 1:00 UTC. Source changes will be possible during that time, but no builds will be scheduled.

adrianSuSE wrote 4 weeks ago

Added Ubuntu 13.04 and Debian 7.0 build targets

adrianSuSE wrote 4 weeks ago

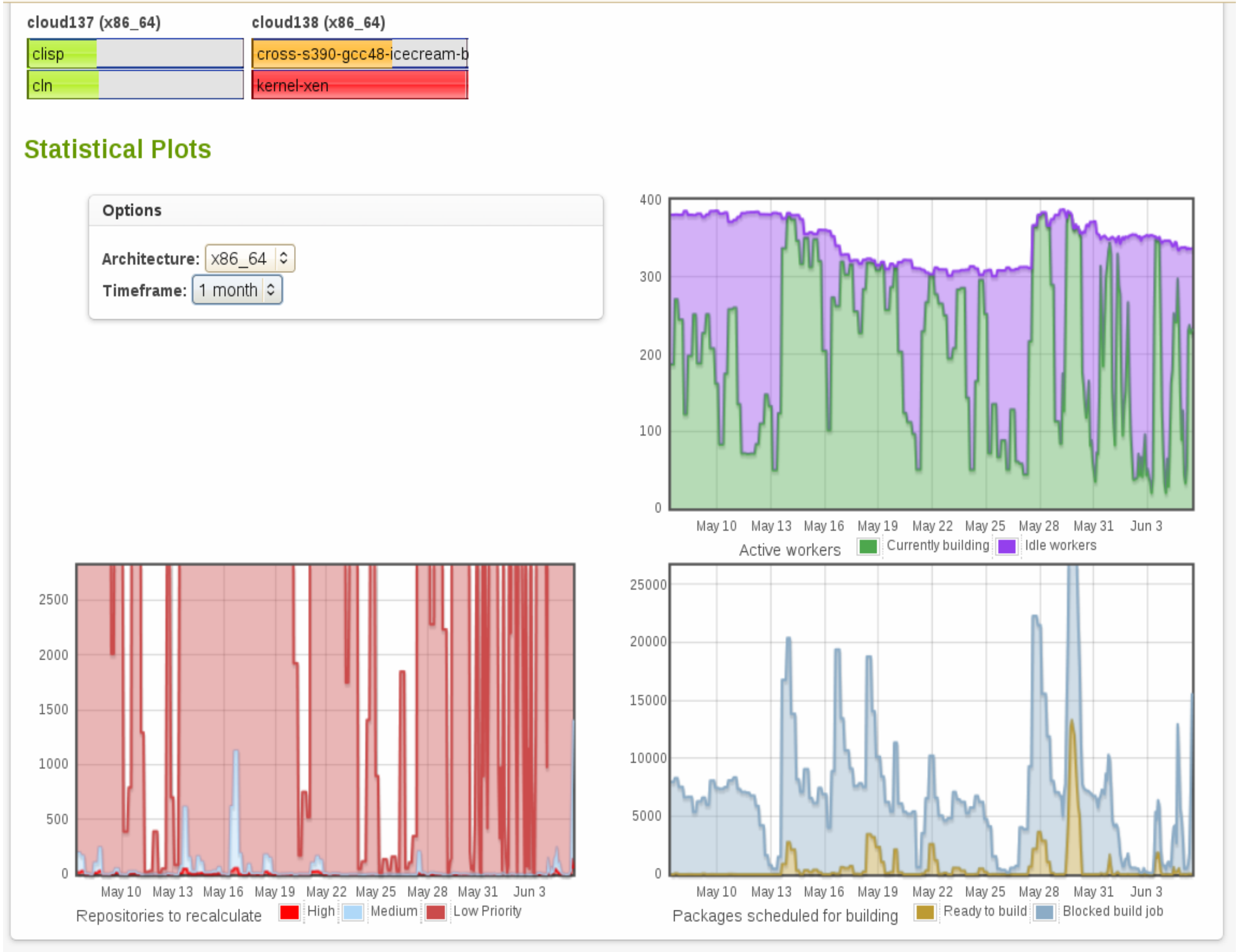
OBS updated to version 2.4.1

adrianSuSE wrote 6 weeks ago

Fixed some build hosts (mostly hard disk failures)

Latest Updates

IPython	1 min ago
home:asp100m	1 min ago
perl-DBD-Oracle	4 min ago
hplip	4 min ago
python3	5 min ago
perl-Log-Dispatch	5 min ago



cloud137 (x86_64)

clisp

cln

cloud138 (x86_64)

cross-s390-gcc48-icecream-b

kernel-xen

Statistical Plots

Options

Architecture: x86_64

Timeframe: 1 month

Private OBS and Interconnect

- Access Sources and Binaries of remote OBS instance
  - Support different architectures and distributions
  - Proprietary sources that must not leave the company
- Remote Instance is “mounted” in the project space
  - Source and binary package caching
  - Automatic merging & rebuilds also work with remote data
- build.opensuse.org
  - connections from 90 other instances

Warum private OBS instance

- Control
- Reduced dependencies
- Scheduler options
- Create local Repositories
- Own backends(tmpfs, SSD)
- Integrate in workflows

Scheduler options

- rebuild-modes
  - Transitive <!-- DEFAULT: build on source change and all depending packages including indirect dependencies -->
  - Direct <!-- build on source change and direct depending packages -->
  - Loca <!-- build on source change only -->
- Block-modes
  - All <!-- DEFAULT: block until all packages we depend on are built -->
  - Local <!-- like all, but ignore packages from other repositories -->
  - Never <!-- immediately start building the packages -->
- Linkedbuild-modes
  - Off <!-- DEFAULT: do not build packages from project links -->
  - Localdep <!-- only build project linked packages if they depend on a local package -->
  - All <!-- treat packages from project links like local packages →
    - docs/api/api/obs.rng

osc
openSUSE build service command-line tool

Konfiguration osc

- ~/.oscrc
  - apiurl = https://api.opensuse.org
  - build-root = /ssd
  - [https://obs3.site.tld:444]
  - keyring=1
- alias osc3='osc -A https://obs3.site.tld:444'

Osc Kommandos

- **Anwender**
  - search se
  - list LL
  - getbinaries
    - osc ls -b OBS:Server:2.4 ruby
    - osc getbinaries OBS:Server:2.4 ruby19 SLE_11_SP2 x86_64
  - config –dump

  - rpm -q --queryformat '%{DISTURL}\n'

osc Kommandos(contd.)

- **Entwickler**
  - checkout co
  - addremove ar
  - update up
  - commit ci
  - vc
  - Meta
  - Mkpac
  - Rebuild
  - Prjresults
  - linkpac

osc Kommandos(contd.)

- **Maintainer** builds an entire update incident
  - mbranch glibc   (home:branches)
  - mbranch --checkout glibc
  - branch --maintenance openSUSE:12.2 glibc
  - branch -M -c openSUSE:12.1 glibc
  - Patchinfo
  - maintenancerequest

    - http://doc.opensuse.org/products/draft/OBS/obs-reference-guide_draft/cha.obs.maintenance

osc API

- osc api -X GET /source/OBS:Server:2.4/_meta
- osc -A "https://api.opensuse.org"
- osc api -X POST "/source/home:rdannert:test-github-co/test3?cmd=set_flag&flag=build&status=disable"

  - zypper in obs-api
  - /srv/www/obs/docs/api/api.txt

osc –help

- **getbinaries** PROJECT PACKAGE REPOSITORY ARCHITECTURE
- **repos** - shows repositories configured for a project
- **addremove (ar)** Adds new files, removes disappeared files
- **update (up)** Update a working copy
- **meta** <prj|pkg|prjconf|user|pattern|attribute> -e
- **build** - Build a package on your local machine
- **checkout (co)**
- **commit (ci)** - Upload content to the repository server
- **linkpac** - "Link" a package to another package

Source Services

Source Services

- tools to validate, generate or modify sources in a trustable way
- meta file(part of package sources) should trigger the services
- instance needs internet connection for its services
- **Modes**:
  - **run:** run defined services locally. In case paramteres exists for this one in _service file they are used!
  - **disabledrun:** run disabled or server side only services locally and store files as local created
  - **remoterun:** trigger a re-run on the server side
  - osc service -h
- complete example:
  - home:rdannert:test-github-co > devstack > README
  - https://build.opensuse.org/package/view_file?expand=1&file=README&package=d

Source Services Examples

- tar_scm - Create an archive from your source code repository
- extract_file - Extract files from an archive
- recompress - Change archive compression
- set_version - Update package version in .spec and .dsc files

- http://wiki.meego.com/OBS_source_services

Source Services(cont.)

- osc service dr
- osc status
- osc diff
- # prepare caching for disabled runs:
- # mkdir -p ~/.obs/cache/tar_scm/{incoming,repo,repourl}
- # echo "CACHEDIRECTORY=\"$HOME/.obs/cache/tar_scm\""
  > ~/.obs/tar_scm
- http://doc.opensuse.org/products/draft/OBS/obs-reference-guide_draft
- http://en.opensuse.org/openSUSE:Build_Service_private_instance_so

Read The Source..

- Git clone git://github.com/openSUSE/open-build-service.git
- git log -p docs/api/api/obs.rng

Übung

- Kopieren package devstack aus project home:rdannert:test-github-co in private OBS und Source Service ausführen

Lösung

- Neues Projekt im private OBS erzeugen:
- osc3 meta prj <yourproj> -e
- osc3 linkpac openSUSE.org:home:rdannert:test-github-co devstack <yourproj>
  - A linked package is a clone of another package, but plus local modifications. It can be cross-project
- osc3 co <yourproj>
- cd <yourproj>/devstack
- osc3 service dr
  - git checkout erzeugt tar file, recompress zu bz2 und Version Update in test2.spec
- osc3 status
  - ?   devstack-1370575560.tar.bz2
  - M   test2.spec

Image bauen mit kiwi

KIWI

- Create full OS images, based on packages
- End result :
  - Appliances
  - Live CD / DVD / USB images (can be hybrid)
  - Disk / USB preload images
  - PXE images
- Image configuration:
  - XML file (package list, image settings)
  - Optional Shell script run after installing packages
  - Tarball with additional files

- OBS knows currently these types of packages:
  - rpm/spec builds
  - deb/dsc builds
  - KIWI Image (aka known as appliance image = raw)
  - KIWI Product Image (aka Installation Media = iso)

  - Image builds are just another “package” build for the Build Service

Limitations of Image builds within OBS

- Only OBS repositories can be used
- Own/modified boot description templates need to get packaged
- Used packages must be unambiguous !
- Currently no pattern support
- **Server may wait for building packages and does not start immediately**
- → Local osc build works at any time
- Non-ISO build results are stored in tar ball, extended with Build number

How to setup a KIWI repo

- Create a repository in a project
  - Enable wanted architectures
  - No other repository needed in project config. KIWI's xml is specifing it
  - Create project config, setting this repository to
    - Type: kiwi
    - Repotype: none
  - Create a package
  - Submit adapted KIWI config files

What needs to be changed in KIWI configs for OBS ?

- The config.xml needs to be suffixed as .kiwi
- Repositories needs to be specified as obs://$PROJECT/$REPOSITORY
  - obs:// refers always to the used build service
  - Example: obs://openSUSE:11.1/standard
  - Content of root directory needs to get packaged as root.tar or root.tar.bz2
  - In case of expansion error “have choice” just select a package and add it to your package list

Examples

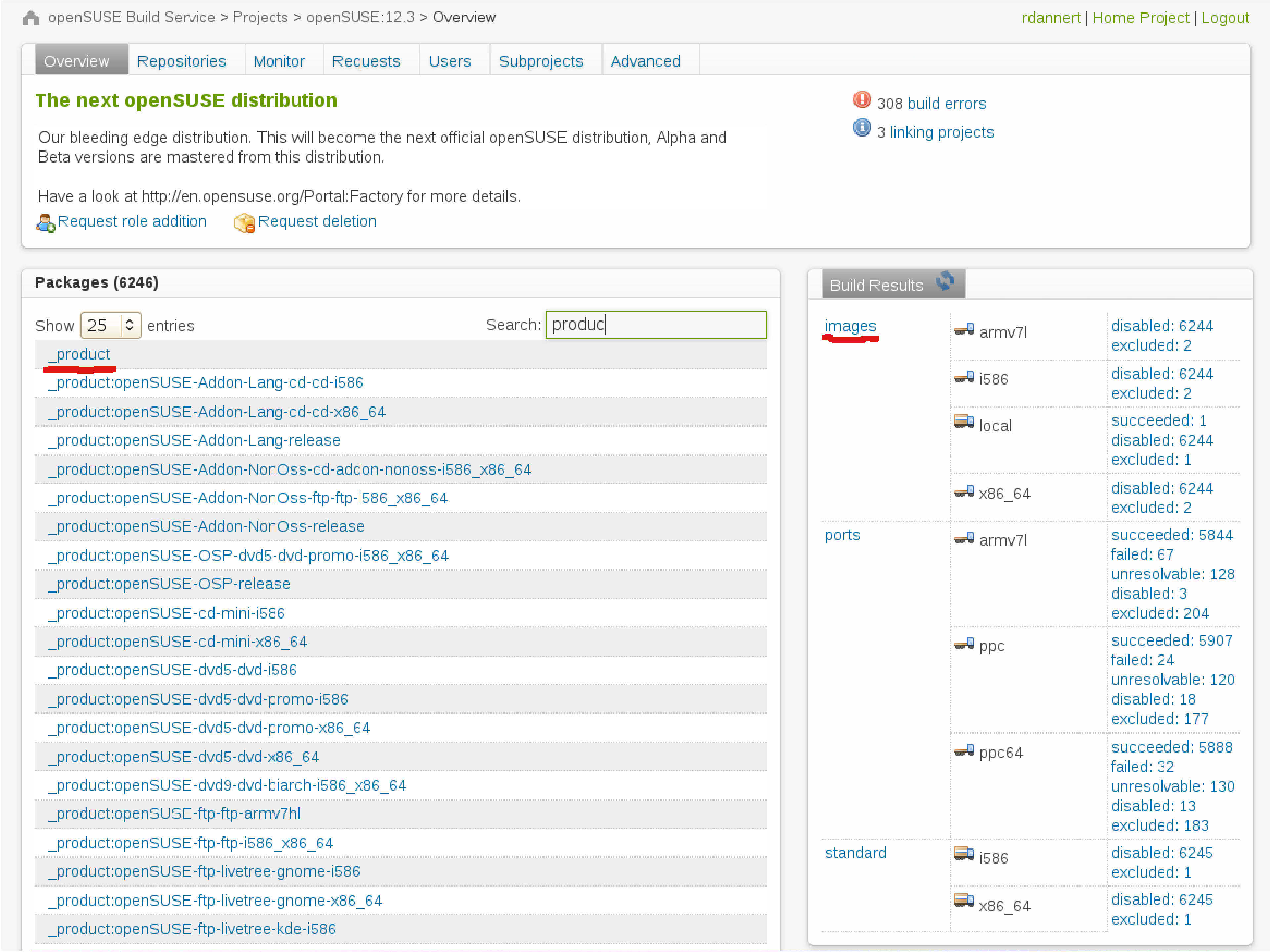
- home:rdannert:branches:OBS:Server:2.4
  - OBS-Appliance
- home:rdannert:kiwi
  - suse-12.2-JeOS
    - adapted from /usr/share/kiwi/image/suse-12.2-JeOS/config.xml from rpm kiwi-templates

Installation Media Creation (aka Product Creation)

- product KIWI config has its own section
- no automatic dependency solving
  - RPM package which are used for installation
  - Meta packages (get extracted on the media)
  - Generate meta data
- Problem: each product media needs its own kiwi config
- Solution: product configs

Spec for image builds

- http://en.opensuse.org/openSUSE:Build_Service_Concept_Product_D
- product configs in OBS specifing all medias for a Product
- product definition files are stored in _product
- resulting sources get generated as “_product:....” packages on checkin time
- OBS runs product converter on each source change in _product package
  - release package spec files
  - kiwi package for each flavor and each architecture set
- part of the obs-productconverter



openSUSE Build Service > Projects > openSUSE:12.3 > Overview

rdannert | Home Project | Logout

The next openSUSE distribution

Our bleeding edge distribution. This will become the next official openSUSE distribution, Alpha and Beta versions are mastered from this distribution.

Have a look at http://en.opensuse.org/Portal:Factory for more details.

308 build errors

3 linking projects

Packages (6246)

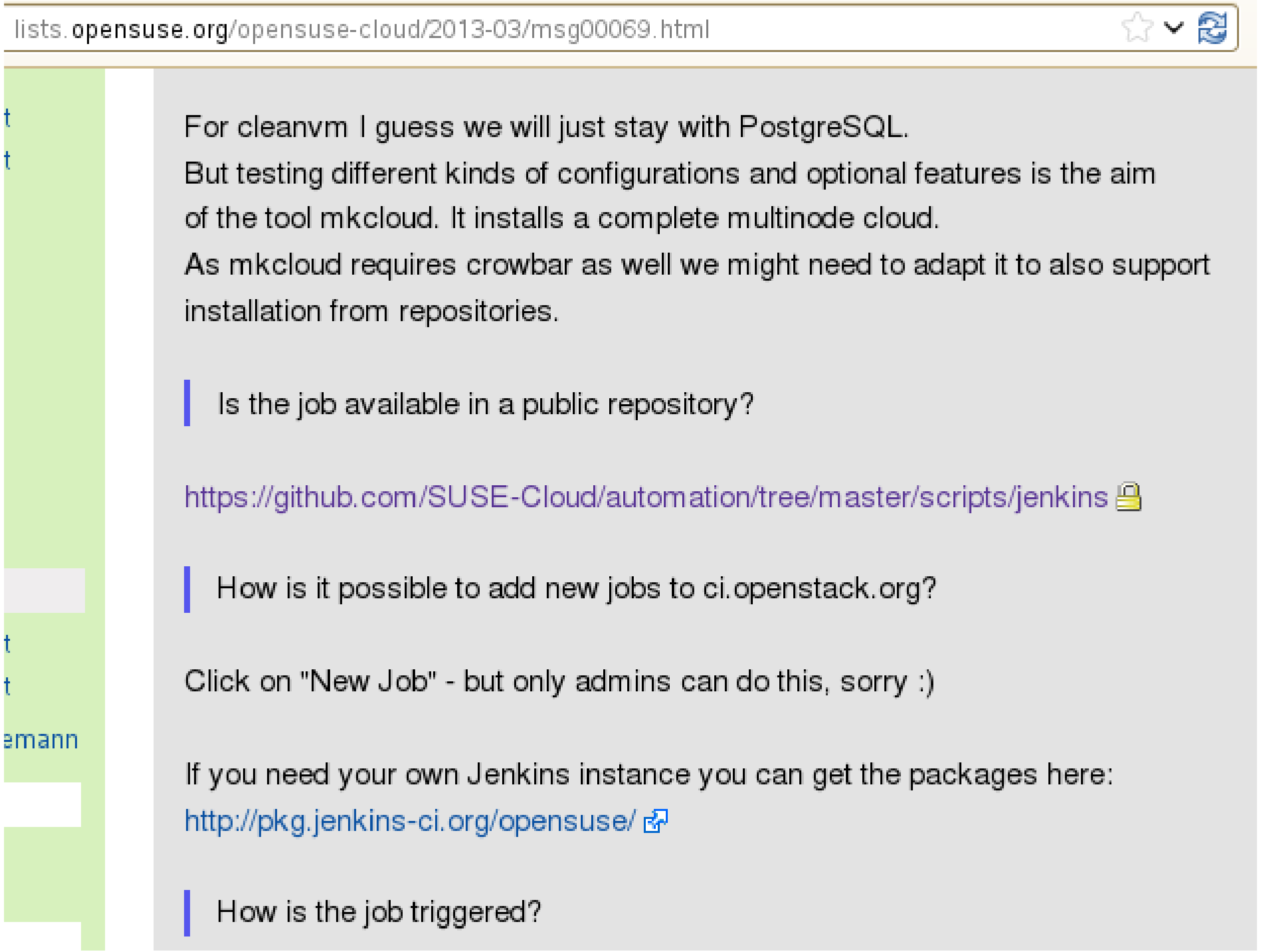
Show 25 entries Search: produc

- _product
- _product:openSUSE-Addon-Lang-cd-cd-i586
- _product:openSUSE-Addon-Lang-cd-cd-x86_64
- _product:openSUSE-Addon-Lang-release
- _product:openSUSE-Addon-NonOss-cd-addon-nonoss-i586_x86_64
- _product:openSUSE-Addon-NonOss-ftp-ftp-i586_x86_64
- _product:openSUSE-Addon-NonOss-release
- _product:openSUSE-OSP-dvd5-dvd-promo-i586_x86_64
- _product:openSUSE-OSP-release
- _product:openSUSE-cd-mini-i586
- _product:openSUSE-cd-mini-x86_64
- _product:openSUSE-dvd5-dvd-i586
- _product:openSUSE-dvd5-dvd-promo-i586
- _product:openSUSE-dvd5-dvd-promo-x86_64
- _product:openSUSE-dvd5-dvd-x86_64
- _product:openSUSE-dvd9-dvd-biarch-i586_x86_64
- _product:openSUSE-ftp-ftp-armv7hl
- _product:openSUSE-ftp-ftp-i586_x86_64
- _product:openSUSE-ftp-livetree-gnome-i586
- _product:openSUSE-ftp-livetree-gnome-x86_64
- _product:openSUSE-ftp-livetree-kde-i586

Build Results

images	armv7l	disabled: 6244 excluded: 2
	i586	disabled: 6244 excluded: 2
	local	succeeded: 1 disabled: 6244 excluded: 1
	x86_64	disabled: 6244 excluded: 2
ports	armv7l	succeeded: 5844 failed: 67 unresolvable: 128 disabled: 3 excluded: 204
	ppc	succeeded: 5907 failed: 24 unresolvable: 120 disabled: 18 excluded: 177
	ppc64	succeeded: 5888 failed: 32 unresolvable: 130 disabled: 13 excluded: 183
standard	i586	disabled: 6245 excluded: 1
	x86_64	disabled: 6245 excluded: 1

ci.opensuse.org



lists.opensuse.org/opensuse-cloud/2013-03/msg00069.html

t
t
t
t
emann

For cleanvm I guess we will just stay with PostgreSQL.
But testing different kinds of configurations and optional features is the aim
of the tool mkcloud. It installs a complete multinode cloud.
As mkcloud requires crowbar as well we might need to adapt it to also support
installation from repositories.

> Is the job available in a public repository?

https://github.com/SUSE-Cloud/automation/tree/master/scripts/jenkins

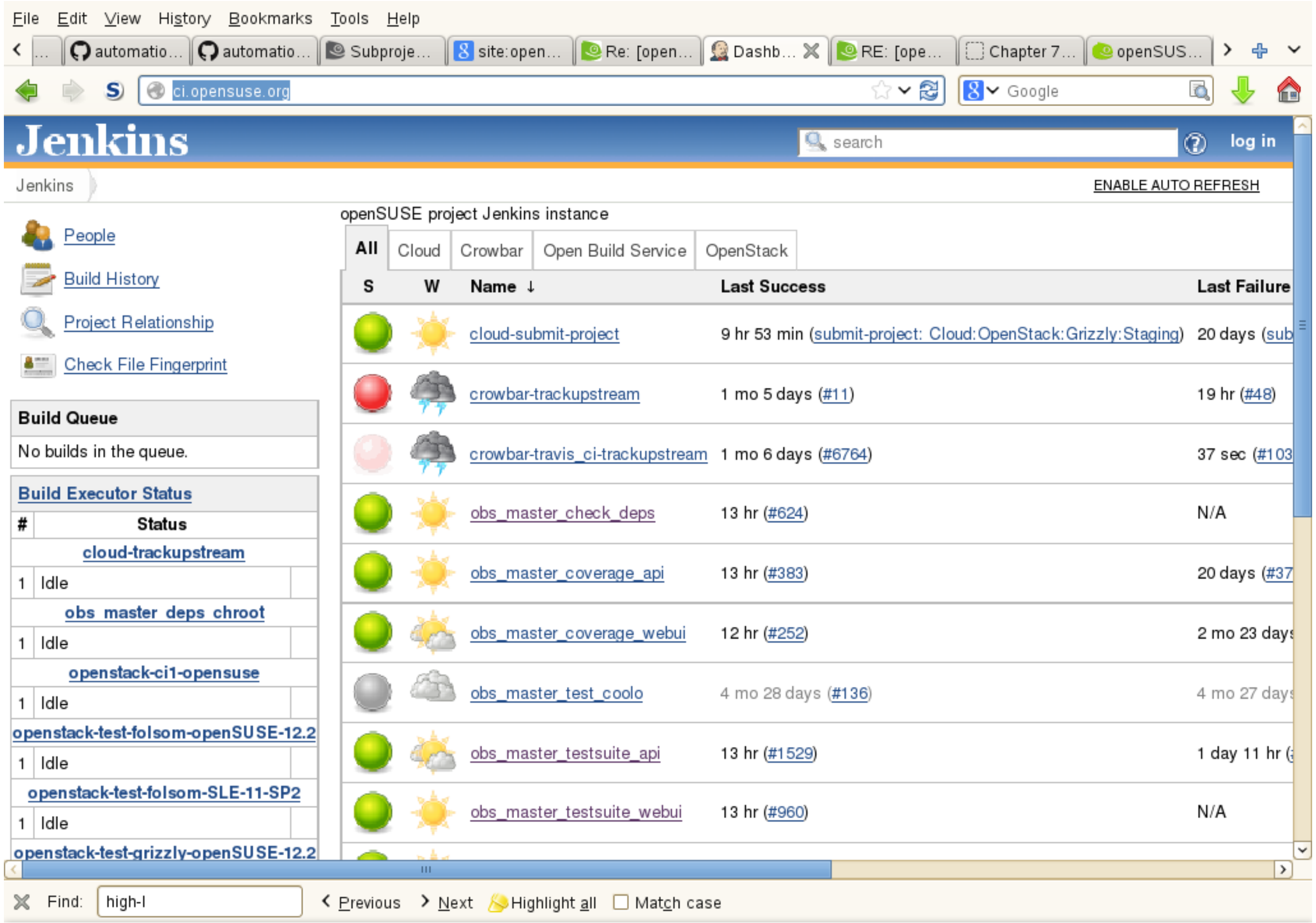
> How is it possible to add new jobs to ci.openstack.org?

Click on "New Job" - but only admins can do this, sorry :)

If you need your own Jenkins instance you can get the packages here:
http://pkg.jenkins-ci.org/opensuse/

> How is the job triggered?

Jenkins Integration



openSUSE project Jenkins instance

All | Cloud | Crowbar | Open Build Service | OpenStack

S	W	Name ↓	Last Success	Last Failure
🟢	☀	cloud-submit-project	9 hr 53 min (submit-project: Cloud:OpenStack:Grizzly:Staging)	20 days (sub
🔴	⛈	crowbar-trackupstream	1 mo 5 days (#11)	19 hr (#48)
🔴	⛈	crowbar-travis_ci-trackupstream	1 mo 6 days (#6764)	37 sec (#103
🟢	☀	obs_master_check_deps	13 hr (#624)	N/A
🟢	☀	obs_master_coverage_api	13 hr (#383)	20 days (#37
🟢	⛅	obs_master_coverage_webui	12 hr (#252)	2 mo 23 days
⚪	☁	obs_master_test_coolo	4 mo 28 days (#136)	4 mo 27 days
🟢	⛅	obs_master_testsuite_api	13 hr (#1529)	1 day 11 hr (
🟢	☀	obs_master_testsuite_webui	13 hr (#960)	N/A

Build Queue

No builds in the queue.

Build Executor Status

#	Status
	cloud-trackupstream
1	Idle
	obs_master_deps_chroot
1	Idle
	openstack-ci1-opensuse
1	Idle
	openstack-test-folsom-openSUSE-12.2
1	Idle
	openstack-test-folsom-SLE-11-SP2
1	Idle
	openstack-test-grizzly-openSUSE-12.2

blob/master/scripts/jenkins/ci.opensuse.org/openstack-cleanvm.xml

Automation Scripts

- https://github.com/SUSE-Cloud/automation

- This repository contains various scripts which SUSE uses to automate development, testing, and CI (continuous integration) of the various components of SUSE Cloud, i.e. OpenStack and Crowbar.

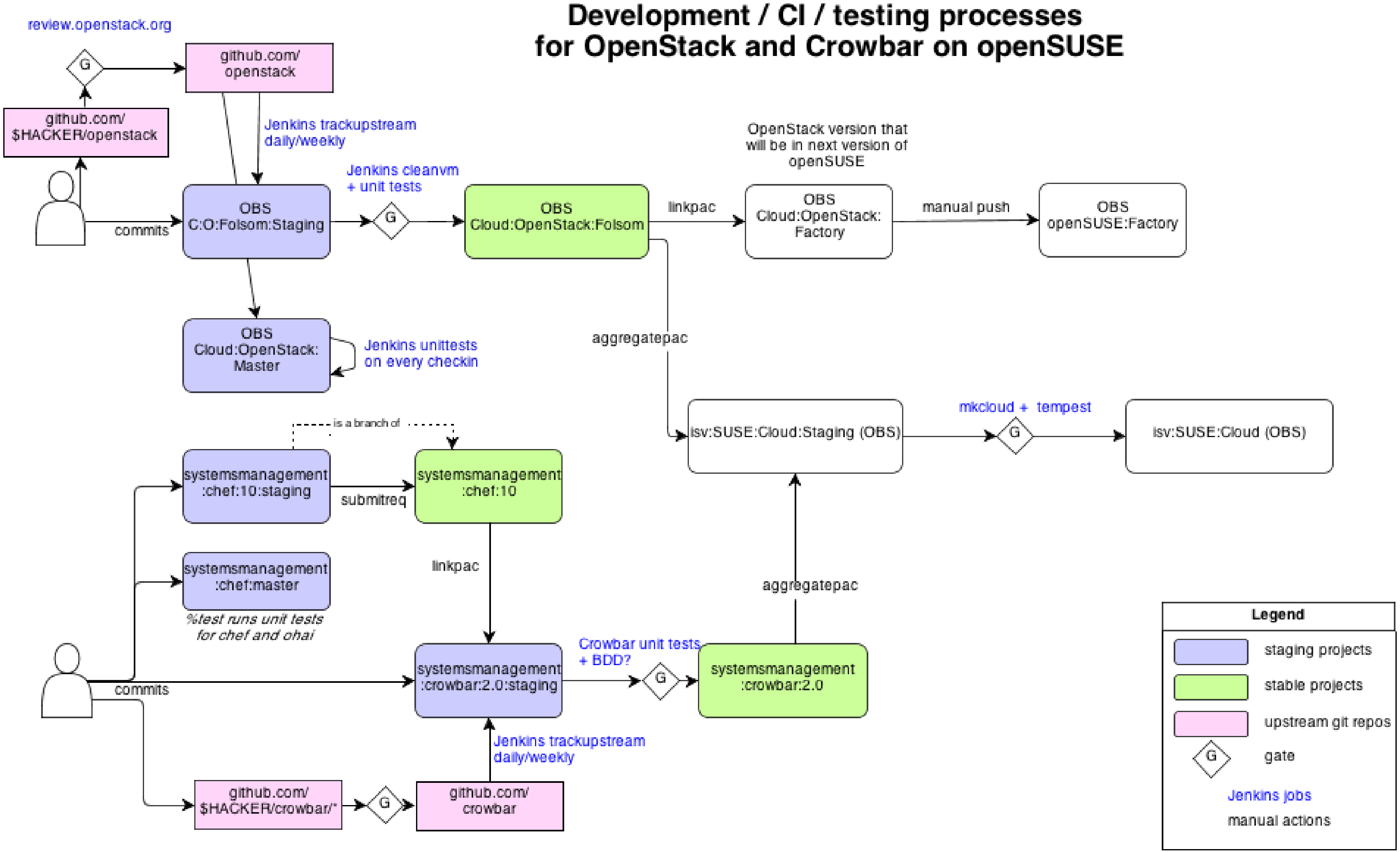
- Example:
  - scripts/jenkins/ci.opensuse.org/openstack-cleanvm.xml

Mehrwerte Jenkins/Hudson

- fortlaufende Erstellung der Software
- automatisiertes Testen
- Integration in bestehende Abläufe
- Einfache Verwaltung von zeitgesteuerten Starts der Tests sowie Benachrichtigung
- Komfortable Übersicht und Kontrolle der ausgeführten Testläufe in einer webbasierten Oberfläche

Quelle: http://www.qfs.de/qftest/manual/de/user_hudson.html

Continuous Integration(CI) Between Github And OBS With Jenkins



Development / CI / testing processes
for OpenStack and Crowbar on openSUSE

review.openstack.org

G

github.com/
openstack

github.com/
$HACKER/openstack

Jenkins trackupstream
daily/weekly

commits

OBS
C:O:Folsom:Staging

Jenkins cleanvm
+ unit tests

G

OBS
Cloud:OpenStack:Folsom

linkpac

OpenStack version that
will be in next version of
openSUSE

OBS
Cloud:OpenStack:
Factory

manual push

OBS
openSUSE:Factory

OBS
Cloud:OpenStack:
Master

Jenkins unittests
on every checkin

aggregatepac

is a branch of

isv:SUSE:Cloud:Staging (OBS)

mkcloud + tempest

G

isv:SUSE:Cloud (OBS)

systemsmanagement
:chef:10:staging

submitreq

systemsmanagement
:chef:10

systemsmanagement
:chef:master

%test runs unit tests
for chef and ohai

linkpac

aggregatepac

commits

systemsmanagement
:crowbar:2.0:staging

Crowbar unit tests
+ BDD?

G

systemsmanagement
:crowbar:2.0

Jenkins trackupstream
daily/weekly

github.com/
$HACKER/crowbar/*

G

github.com/
crowbar

Legend

🟦 staging projects

🟩 stable projects

🟪 upstream git repos

G gate

Jenkins jobs

manual actions

http://en.opensuse.org/openSUSE:OpenStack_and_Crowbar_development_process

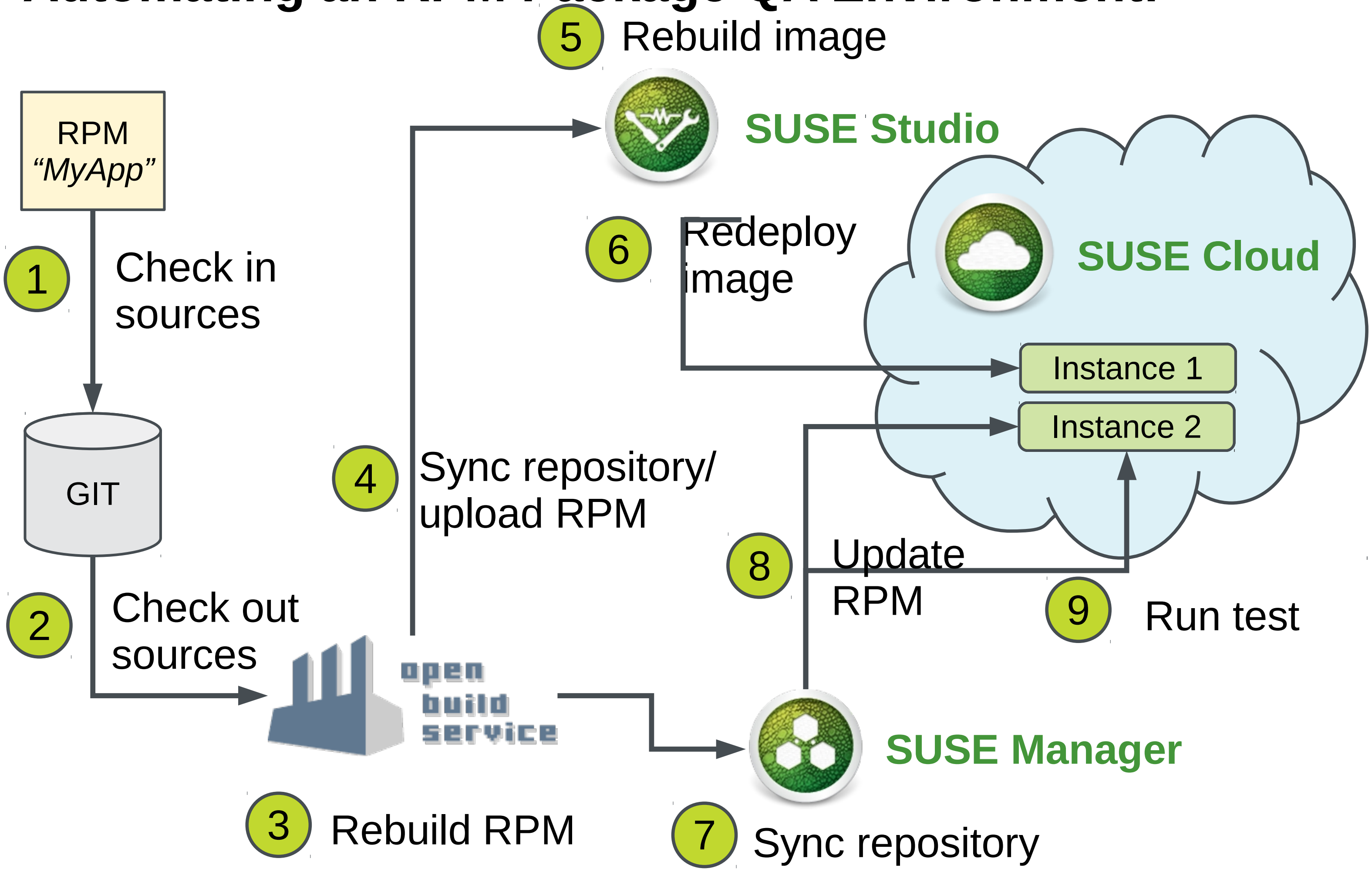
Continuous Integration(CI) with OBS

- Prerequisites:
  - Have established Agile development processes
  - Provide test cases
  - Define trigger mechanisms(checkouts, code changes)
  - Use jenkins
- Results:
  - More frequent builds
  - Faster deployment
  - Automated testing for packages and whole product(kiwi based Appliance)

Appendix

SUSE Cloud Product Integration

Automating an RPM Package QA Environment:



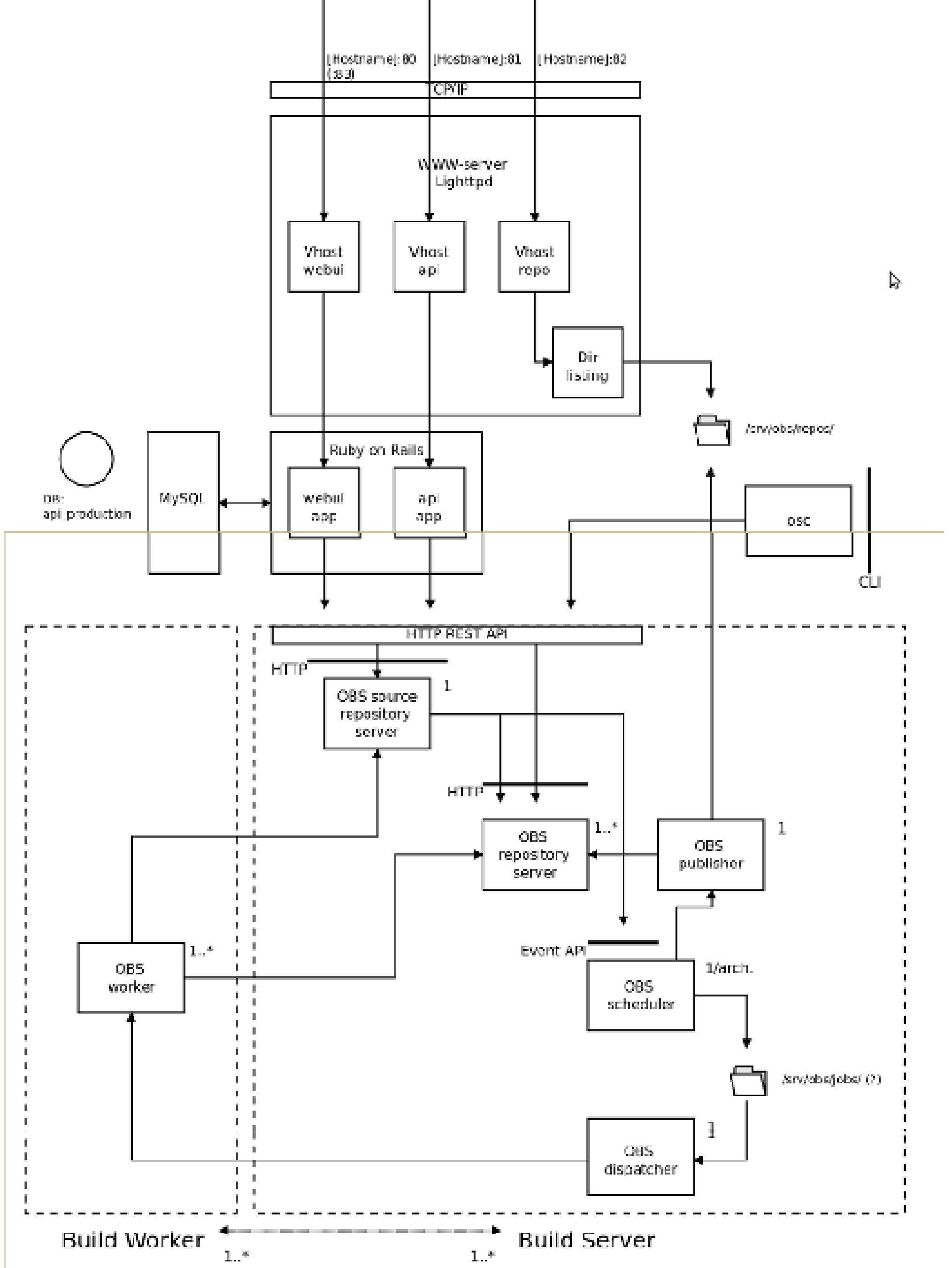


Figure 3.2: OBS Internal Architecture [30]

Setup And Config Private OBS

- http://download.opensuse.org/repositories/OBS:/Server:/2.4/images/iso/
- /etc/sysconfig/obs-server
- ## Type: regexp((i586|x86_64|ppc|ppc64|s390|s390x|ia64|sparc|sparcv8|sparcv9|sparcv9v|sparc64|sparc64v|mips|mips64|mipsel|mips64el|armv4l|armv5el|armv6el|armv7el|armv7hl|armv8el|sh4)+)
- ##e.g. a system with 4 schedulers and
- ## appropriately loaded sources/binaries can eat 1-2 GB RAM
- OBS_SCHEDULER_ARCHITECTURES="x86_64"
- OBS_LOG_DIR="/srv/obs/log"
- OBS_REPO_SERVERS="obs3.site.tld:5252"
- ## Description: Setup LVM via obsstoragesetup
- OBS_SETUP_WORKER_PARTITIONS="use_obs_vg"
- Optional: install aditional OBS worker components
- http://en.opensuse.org/openSUSE:Build_Service_Appliance

URLs

- Open Build Service(OBS)
  - http://openbuildservice.org/

    From GIT to a custom OS image in a few click
  - https://www.desktopsummit.org/sites/www.desktopsummit.org/files/for_git_to_your_c
  - openSUSE instance : http://build.opensuse.org/
  - http://de.opensuse.org/Portal:Build_Service
  - http://doc.opensuse.org/products/draft/OBS/obs-reference-guide_draft/cha.obs.sour
- SUSE Studio:
  - http://susestudio.com/
- KIWI:
  - http://kiwi.berlios.de/
  - Tutorial : http://en.opensuse.org/Portal:KIWI

Mailing lists + irc

- http://lists.opensuse.org/opensuse-buildservice/
- http://groups.google.com/group/kiwi-images

- irc on freenode:
- #opensuse-buildservice
- #opensuse-kiwi
- #susestudio

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